REMARKS

Claims 26, 33 and 37 are amended and Claims 19-24 are cancelled. Claims 26-44, as amended, remain in the application. No new matter is added by the amendments to the claims.

The Rejections:

In the Office Action dated April 1, 2008, the Examiner rejected Claims 26, 27 and 38-43 under 35 U.S.C. 103(a) as being unpatentable over Reighard et al. (6,173,864). The Examiner stated that Reighard discloses a method for accurately dispensing controlled amounts of viscous material such as during printed circuit (PC) board assembly by using a system which includes a pressurized supply of the viscous material, a dispenser connected with the pressurized supply and a feedback control for ensuring that a discrete dispensed amount corresponds closely to the desired dispensed amount for a particular application (col.2 lines 3-10). The different methods of feedback control include changing pressure of the pressurized supply after measuring a dispensed amount and comparing the dispensed amount with a stored value representing the desired amount; changing an air operating pressure associated with the dispenser; adjusting the duration that the dispenser is maintained on to dispense the viscous material; or combination thereof (col.2 lines 22-32). They are preferably used in succession (col.2 lines 32-35). In one embodiment, a first amount of the viscous material is discharged from the dispenser, measuring the first amount of viscous material, comparing the first amount to a commanded or desired control amount stored in a memory device, and adjusting the pressure of the pressurized supply to correct for a difference between the first amount and the control amount (col.3 lines 1-8). Another method which may be used alternatively or in conjunction with the previously described method involves discharging a first amount of the viscous material from a dispenser valve, measuring the first amount of viscous material, comparing the first amount to a commanded control amount stored in a memory device, and adjusting a fluid operating pressure used to actuate the dispenser valve to correct for a difference between the first amount and the commanded control amount. A nozzle may be utilized (col.6 lines 25-26) and the volume can be measured (col.4 lines 1-25). The dispensing step can be repeated (col.2 lines 22-44) and the viscosity of the material is disclosed (col.1 lines 13-19). However, the reference fails to specifically teach a compensation factor.

It is noted that the applicant defines compensation factor as the difference between a theoretical volume and an actual volume (paragraph 8). The reference clearly teaches of measuring the amount of viscous material (actual) and comparing it to a control amount (theoretical). It is the Examiner's position that the reference meets the limitation of a compensation factor.

In addition, the reference teaches measuring a pressure to determine a theoretical volume. It is noted that the reference clearly teaches of measuring the amount of viscous material. A theoretical volume is already established. It would have been obvious to one skilled in the art to change the theoretical volume based on pressure measurements with the expectation of obtaining a more precise process of dispensing material.

The limitations of Claims 27 and 41-43 have been addressed above.

In Claims 38-40, the applicant requires detecting differences between different compensation factors. It is the examiner's position that the reference clearly teaches of changing the theoretical values above. One skilled in the art could easily program the difference in theoretical values to flag a user that a disruption has occurred. It would have been obvious to utilize a detection flag with the expectation of obtaining better dispensation control.

The Response:

Applicant appreciates the allowance of Claim 44.

Applicant amended Claim 37 to correct a lack of antecedent basis for "the theoretical dispensing rate".

The Examiner objected to Claims 28-37 to as being dependent upon a rejected base claim, but stated that they would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant amended Claim 33 to independent form. In view of the Examiner's comments, Applicant believes that Claims 33-37 are allowable.

Applicant amended Claim 26 to clarify that the method is performed during a continuous dispensing application. (See Paragraph [0052]; [Figs. 4-6)

The Examiner admitted that Reighard fails to specifically teach a compensation factor as recited in Applicant's Claim 26. However, the Examiner incorrectly stated that Applicant defines the compensation factor as the difference between a theoretical volume and an actual

volume (Paragraph [0008]). According to the Examiner, the reference clearly teaches measuring the amount of viscous material (actual) and comparing it to a control amount (theoretical). It is the Examiner's position that the reference meets the limitation of a compensation factor.

Applicant's Paragraph [0008] states that: "A first new value for the compensation factor is determined based on the comparison between the theoretical and actual volumes of the viscous material dispensed during the first time period." However, Applicant's compensation factor is not "the difference between a theoretical volume and an actual volume" as stated by the Examiner. Applicant's compensation factor is calculated using the following equation in Paragraph [0049]:

$$f_1 = \sum_{T1} [(P_{ti} - b)^N / \text{actual volume}]^{(1/N)}$$

Clearly, Applicant's compensation factor is determined by dividing the pressure measurement by the actual volume measurement. The compensation factor is determined many times during a single dispensing application to provide closed loop control of the dispensing operation.

The initial value $\mathbf{f_{initial}}$ for the compensation factor **f** is used in the equation (Paragraph [0038]) for determining the theoretical volume of the viscous material **10** dispensed over the first time period **T1**. The initial value $\mathbf{f_{initial}}$ for the compensation factor is arbitrarily selected. This arbitrary selection is then corrected after the first time period **T1**.

As explained in Paragraphs [0040] and [0041], the first new value $\mathbf{f_1}$ for the compensation factor **f** is determined according to the above equation. The first new value $\mathbf{f_1}$ for the compensation factor **f** accounts for changes in operational characteristics of the viscous material **10** and the dispensing system **14** that occurred during the first time period **T1**. Hence, the first new value $\mathbf{f_1}$ for the compensation factor **f** can now be used for normal operation of the dispensing system **14** in a second time period **T2**, consecutive with the first time period **T1**. The same procedure is followed for determining the second new value of the compensation factor for use during a consecutive third time period, and so on. The compensation factor is a number that is used with the pressure measurements to determine the theoretical volume of material dispensed.

In contrast, Reighard discloses an open loop control system. A sample **20** of viscous material is dispensed from a nozzle **22** onto a measuring device **24** (weigh scale) as shown in

Fig. 1. The scale **24** generates a weight value $\mathbf{W_{fb}}$ that is sent to a comparing device 28 as shown in Fig. 2. The device **28** subtracts the weight value $\mathbf{W_{fb}}$ from a commanded weight value $\mathbf{W_c}$ to obtain an error value **ERR**. If the error **ERR** is greater than 5%, then a change is made in one or more of the syringe pressure **66**, the solenoid pressure **74** and the on-time **82** and the calibration is repeated. Once the system is calibrated, the dispensing operation onto printed circuit boards can be started.

Thus, Applicant's method as recited in Claim 26 differs from Reighard as follows:

1. Applicant's method is a closed loop control performed during a continuous dispensing application whereas Reighard's method is an open loop calibration operation performed after a dispensing application.

2. Applicant's compensation factor is determined by dividing the pressure measurement by the actual volume measurement whereas Reighard's error value **ERR** is determined by subtracting the weight value $\mathbf{W_{fb}}$ from a commanded weight value $\mathbf{W_c}$.

It is Applicant's position that Reighard does not teach or suggest the compensation factor recited in Claim 26.

The Examiner cited the following references on Form PTO-892 without comment: Cavallaro et al. (US 6173864); Bremner et al. (US 6722536); Manadanas et al. (US 5823387); Smith et al. (US 5747102); Ciardella et al. (US 5711989); Pitz et al. (US 7086861); Lin et al. (US 6302306); and Benson (US 5494191). Applicant reviewed these references and found them to be no more pertinent than the prior art relied upon by the Examiner in the rejections.

In view of the amendments to the claims and the above arguments, Applicant believes that the claims of record now define patentable subject matter over the art of record. Accordingly, an early Notice of Allowance is respectfully requested.